

Exhibit 5

Expert Report of Stephen Rosen

**IN THE UNITED STATES BANKRUPTCY COURT
EASTERN DISTRICT OF MICHIGAN**

In re:

CITY OF DETROIT, MICHIGAN,

Debtor.

Chapter 9

Case No. 13-53846

Hon. Steven W. Rhodes

EXPERT REPORT OF STEPHEN H. ROSEN

July 29, 2014

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- B. If the COPs transaction had never occurred, either the City contributions to the pension plans would be unattainably high, or additional cuts to benefits would have been required. 28

I. INTRODUCTION AND ASSIGNMENT

I have been retained by Kirkland & Ellis LLP, counsel to Syncora Guarantee, Inc. and Syncora Capital Assurance, Inc. (collectively, “Syncora”), to provide independent expert opinions in connection with Syncora’s objection to the City of Detroit’s Fourth Amended Plan for the Adjustment of Debts of the City of Detroit (the “Plan”). In particular, I have been asked to provide opinions regarding the recoveries going to the pension systems under the Plan. The City currently sponsors two defined benefit plans, The General Retirement System of The City of Detroit (“GRS”) and The Police and Fire Retirement System of The City of Detroit (“PFRS”). Detroit also provides for Other Post-Employment (i.e., retirement) Benefits¹ (“OPEB”).

In the Plan, the City sets forth percentage recoveries of claims the City asserts the Class 10 and 11 holders (PFRS and GRS pension systems, respectively) and Class 12 (OPEB) claim holders held as of July 18, 2013 (the “Petition Date”). For instance, the City claims that Class 10 will receive a 59% recovery (with “Outside Funding”) and that Class 11 will receive a 60% recovery (with “Outside Funding.”) Based on my experience as an expert in the field of actuarial science, I have been asked to analyze the City’s work and provide opinions regarding the proper computation of: (i) the pension (PFRS and GRS) claim amounts that existed as of the Petition Date, (ii) the present value of the property distributed on account of those claims, and (iii) the resulting percentage recovery on those claims. I have also been asked to provide opinions regarding the size of the Class 12 (OPEB) claim amount. Finally, I have been asked to provide an opinion on the impact to pension holders had no pension obligation bonds been issued.

The remainder of this report is divided into multiple sections: Part II lays out my background and qualifications in the field of actuarial science generally and pension actuarial work specifically; Part III provides a summary of my opinions; Part IV details a summary of my methodology for arriving at claim recovery percentages while Part V walks through the differences between the City’s claim recovery calculations and my own; finally, Part VI covers the remainder of my opinions in this matter. My work on this project is ongoing and I may be asked to offer additional opinions as new information comes to light.

II. BACKGROUND AND QUALIFICATIONS

Relevant Experience

I am an actuary specializing in the design and implementation of all forms of retirement plans. I am an Enrolled Actuary, Fellow of the Conference of Consulting Actuaries, Member of the American Academy of Actuaries, a Member of the American Society of Pension Professionals and Actuaries, and a Certified Pension Consultant.

I have more than 40 years of professional experience in the retirement plan industry. My experience includes providing services to thousands of companies related to their employee

¹ Although OPEB can include health, life, dental and vision benefits, the City’s OPEB claims are primarily for retiree health benefits.

retirement plans. My expertise includes designing, implementing, and administering all forms of qualified retirement plans, including defined benefit, profit sharing, 401(k), 457, target benefit, cash balance, ESOP, and others.

In addition to supporting many clients in the private sector, I have specific experience working with governmental retirement plans from a number of different perspectives. For example, I was appointed by an oversight committee formed by the City of San Diego to analyze that City's Pension Plan from an actuarial perspective, which included an in-depth review of actuarial professional practices and compliance with actuarial standards in relation to plan governance. Included in that review was the appropriateness of the actuarial assumptions that were selected by the plan's actuary in developing funding levels for the City, both from a contribution perspective, as well as from a financial reporting and disclosure perspective.

I also testified as an expert on behalf of the employees of the City of Philadelphia involving the prudence of the City's selection of available investment options within the City's Retirement Plan. This assignment involved analysis of potential asset allocations and associated investment rates of return. Most recently, I testified as an expert in another employee class action involving the Teachers' Retirement System for the State of West Virginia, defending alleged damages from contractual investment returns.

Relevant Work History

In 1982, I founded Stephen H. Rosen & Associates and the firm has provided on-going consulting and administrative services to more than 700 qualified retirement plans. I was also the founder of Haddon Strategic Alliances, a firm that formed alliances with insurance companies and mutual fund families to provide daily valuation capabilities, fiduciary compliance, employee education and registered investment advice to trustees and participants of qualified retirement plans. In 2005, both corporations were acquired and became wholly-owned subsidiaries of United Retirement Plan Consultants, previously trading as National Investment Managers, a nationally recognized consolidation of independent pension and actuarial firms.

In 2009, I founded SHR Consulting, LLC, a firm that offered customized consulting services to the retirement plan industry. Areas of focus include expert testimony, development of best practices, succession planning, and strategic and management consulting.

I am now an employee of FTI Consulting, Inc. ("FTI") and lead its pension actuarial practice. FTI is a multi-disciplinary consulting firm with leading practices in economic, financial and litigation consulting services. FTI performs financial investigations and provides advice and expert testimony with respect to, among other things, Employee Retirement Income Security Act ("ERISA") and retirement plans (publicly and privately sponsored), accounting matters, insurance and securities matters, damages, fraud, solvency, intellectual property, and valuation.

I am a Past President of the American Society of Pension Professionals & Actuaries (“ASPPA”) and a Member through examination. ASPPA is the leading national organization for retirement plan professionals and has over 15,000 members. I am also the Founder, Past President, and Board Member of the ASPPA Benefits Council of Greater Philadelphia, a regional chapter of ASPPA; and served on the Board of Directors of ASPPA for six years.

I previously served as an officer of the American Academy of Actuaries (“Academy”) and continue to be a Member in good standing. The Academy is a professional association of approximately 17,000 actuaries. I served on the Academy’s Board of Directors for five years.

I actively write and speak on a variety of topics including qualified retirement plans, actuarial science, and other related subjects. I have lectured at numerous actuarial conferences, including the Enrolled Actuaries Meeting, and have also been a frequent speaker for tax, insurance and accounting associations. I have co-authored books, including an *Accountant’s Guide to Employee Benefit Plans*. I am on the Editorial Board for the *Journal of Financial Service Professionals* and have published articles in *Taxation for Accountants* and the *Pennsylvania CPA Journal*. I have served on the faculties at the Institute of Employee Benefits and The American College, both in Philadelphia.

My curriculum vitae, attached as Appendix A, includes a list of my prior testimony within the last four years and publications I authored within the last ten years. FTI is being compensated at \$625 per hour for my time incurred in performing the work necessary to prepare this report. I have been assisted by other FTI professionals working under my direction and supervision in preparation and support of my expert opinions appearing in this report at hourly rates ranging from \$160 to \$720.

III. SUMMARY OF EXPERT OPINIONS

My opinions, which are supported by my 40 years of experience in the retirement plan industry and facts described throughout this report, are as follows:

- My primary opinion is that the Plan significantly understates the expected recoveries for Class 10 (PFRS Pension Claims) and Class 11 (GRS Pension Claims). Consequently, the Plan substantially understates the disparity between the recovery going to Class 10 and Class 11 versus the recovery going to other classes. The difference between the City’s calculations and my calculations is summarized in the table below:

\$ in Millions	GRS			PFRS		
	Claim Amount	Present Value of Contributions	Recovery Percentage	Claim Amount	Present Value of Contributions	Recovery Percentage
Per Plan of Adjustment	\$1,879	\$1,118	59.5%	\$1,250	\$735	58.8%
Per S. Rosen Report	\$1,018	\$1,187	116.6%	\$795	\$921	115.9%

- That primary opinion is supported by the following opinions:
 - The GRS and PFRS claim amounts, as presented in the City's Plan, are overstated and unreasonable. In particular, the City's Class 10 and 11 claim amounts are based on an unreasonable application of an actuarial method for claims determination, and the City uses an inappropriately low discount rate in determining the GRS and PFRS claim amounts. The Plan's pension system claim amounts also include liabilities for participants without a vested benefit. Each of these errors artificially inflates the GRS and PFRS claim amounts.
 - The value of the property distributed to Classes 10 and 11, as presented in the City's Plan, is understated and unreasonable. First, the Plan excludes certain property distributed to Class 10 and 11 claims on account of those claims. Second, the Plan assumes an unreasonably low rate of return on assets and, thus, excludes the value of restored benefits. Third, the City, in its Plan, utilized an inappropriately high discount rate in determining the present value of property distributed to Classes 10 and 11 via DIA and State Settlement Funds. Each of these errors artificially deflates the value of the property distributed to Class 10 and 11 claimholders.
 - Had the City used the appropriate actuarial methods and assumptions, the PFRS recoveries under the Plan would be 116% and the GRS recoveries under the Plan would be 117%. These figures represent the actual best estimates for recoveries to Classes 10 and 11 under the Plan.
- The OPEB claim amount, as presented in the City's Plan, is overstated and unreasonable. The City has provided multiple values to use for an OPEB claim, but presents an unsupported dollar amount that was negotiated with the Retiree Committee. An appropriate basis to determine the value of the OPEB claim amount, which was the original basis for The City's claim, and is in line with industry standards, was not used. Additionally, the OPEB claim amount is artificially inflated as a result of the inclusion of multiple OPEB participants who became eligible for OPEB benefits after the Petition Date.

- Members of the GRS and PFRS Pension Plans are now better situated and the Plans are now in a better financial condition due to the COPs² transaction. Without the COPs transaction, two situations would occur – either the City would need to commit to additional contributions (at least \$2.5 billion) or benefits would need to be cut by approximately 15% for PFRS and 29% for GRS.

IV. SUMMARY OF METHODOLOGY

A. Introduction

Public pension funds are created as a means to provide future retirement benefits to a public entity's employees. In order to provide for those benefits in a manageable way, assets are accumulated within a trust through a combination of cash contributions (employer and employee) and earnings on the investments (selected by the plan trustees), less any expenses incurred to operate the plan (managed by the plan trustees).

At a basic level, my assignment required determining the liability for each pension system as of the Petition Date, the assets in those systems as of the Petition Date, and the recoveries going to the pension systems under the City's Plan. While determining these amounts may sound like an easy calculation, it is actually a complex actuarial exercise which requires estimating future benefits owed, utilizing multiple demographic and other actuarial assumptions, and discounting future cash flows to present value.

In particular, I have been asked to develop three sets of actuarial calculations for each retirement system:

- 1) the claim amount as of the Petition Date for Classes 10 and 11,
- 2) the present value of future distributions that make up the recovery amounts for Classes 10 and 11 under the Plan, and
- 3) the determination of what the claim and recovery amounts would be if the COPs transaction and the bankruptcy filing had never occurred.

In order to perform these actuarial calculations, it was necessary for me to first collect participant data attributable to both pension plans.

B. Data Collection and Testing

First, I had to establish the best actuarial valuation date to use as a starting point for my analysis. The Petition Date for the City's bankruptcy was July 18, 2013 making the actuarial valuation closest to the Petition Date the valuation as of June 30, 2013. Milliman, serving as the City's actuary in this case, used this June 30, 2013 valuation

² Certificates of Participation issued in 2005 and 2006 to the Detroit Retirement Systems Funding Trusts.

data to develop the pension claims. I followed this same process to determine claims, as is customary in the profession.³

I did not receive access to 2013 participant data until May of 2014, at which point I was furnished with the 2013 actuarial data from the Clark Hill Law Firm in the form of an Access database, containing more than 80,000 records. After reviewing the multiple tables provided and the data processes described in Milliman letters⁴, I was able to replicate and verify the Milliman results for both GRS and PFRS. This sort of replication is common in my field and validates that I am using the correct data. Once the replication is complete, I can then comfortably utilize that data with my own set of assumptions instead of those provided by the City.

The number of plan participants that I used in valuing both plans is comparable to the employee data counts included in the actuarial valuation reports produced by Gabriel Roeder Smith⁵ (“Gabriel”), which serves as system actuary to both GRS and PFRS. Those data counts are also comparable to those used by Milliman, with one exception – Milliman included almost 300 additional active employees in their GRS actuarial data that were not included in the table of actives created for the actuarial valuations (or used by Gabriel in their actuarial valuations). It appears that this disparity was related to analysis of the underlying data performed by Milliman.⁶

The number of participants I used in my valuation was substantially similar to the numbers provided by Gabriel. I have determined that there are 19,878 participants in GRS. Gabriel determined the count to be 19,848 (i.e., a difference of 0.2%). In PFRS, I determined that there were 11,975 participants, while Gabriel determined there to be 11,968 (i.e., a difference of less than 0.1%). I consider that difference in participant count to be immaterial in granting my opinions.

When preparing actuarial analysis for public pension plans, a standard practice is to first match the liabilities calculated by the existing system actuary to those that I have calculated⁷. Again, this sort of replication is used in the actuarial profession to confirm that I am working with correct data and that I have properly identified the actuarial assumptions previously used. It is customary in the profession to perform and rely on a match valuation that falls within a 5% corridor to be considered reasonable⁸. For GRS, my calculation of the liabilities fell within a 2% corridor when compared to the actual

³ Actuarial Standards of Practice No. 4 (Measurement Date Considerations), Section 3.4.

⁴ Exhibit II in both April 17, 2014, Actuarial Accrued Liability letters to Mr. Evan Miller (POA259442 and POA259729).

⁵ Gabriel Roeder Smith & Company is the actuarial firm retained by both GRS and PFRS. The Firm was also retained by the City to prepare OPEB valuations.

⁶ 6/30/14 Bowen Dep. Tr. at 146:10–147:15.

⁷ Actuarial Standards of Practice No. 23 (Data Quality), Section 3.5.

⁸ IRS Revenue Procedure 2010-3.

valuation results prepared by Gabriel. For PFRS, my results fell within a 0.5% corridor of Gabriel's. Therefore, both are considered reasonable replications of the Plans' valuations, and it is appropriate for me to rely on those calculations as a basis for my opinions.

Once I was comfortable that my model produced reasonable liabilities (when compared to ongoing results produced by Gabriel), I used the same model to calculate claim amounts. Since claims are determined as of the Petition Date, I calculated liabilities assuming no additional years-of-service credit or salary adjustments after the Petition Date of July 18, 2013. A more thorough description of the claim determination is provided below.

I was also able to use my model to replicate the actuarial liabilities used by Milliman in the determination of funding requirements for GRS and PFRS under the terms of the Plans. After a thorough replication, I was comfortable relying on Milliman's contribution determinations for years after 2023. As a result, I relied on such contribution amounts for my recovery calculations.

C. Claim Calculation: Use of the Unfunded Present Value of Vested Accrued Benefits

For reasons discussed throughout my report, I established the claim calculation for both Plans to be the unfunded present value of vested accrued benefits ("UPVVAB").

In order to determine this UPVVAB, I needed to first determine the actuarial liability as of the Petition Date, which I determined to be the present value of vested accrued benefits ("PVVAB"). The PVVAB is the determination, in today's dollars, of currently earned benefit amounts payable in the future. Because we are dealing with a claim amount determined as of a date certain, I believe it most appropriate to use *vested* benefits earned as of the Petition Date to determine the claim amount.⁹

One important step in determining the PVVAB is to select the appropriate actuarial funding method as there are many such methods used to determine liabilities. The appropriateness of each method is based on many factors, including how future benefits are to be earned. It is best practice in our field to adjust¹⁰ the actuarial funding method when a plan, as is the case here, is frozen¹¹ so that there is no cost for future accruals (thus, the liabilities will mirror the present value of vested accrued benefits). The specific method I believe is most appropriate in valuing a frozen plan is the Unit Credit Funding Method. Utilizing other funding methods, such as the Entry Age Normal method, once a plan is frozen can lead to a significant overestimation of liability.

⁹ The determination of a benefit earned as of a specific date (such as the Petition Date) is the value of the frozen benefits as of that same date.

¹⁰ In the context of my report, adjusting an existing funding method to reflect a plan freeze can be considered the same as changing funding methods.

¹¹ See IRS Revenue Procedure 2000-40.

The *unfunded* present value of vested accrued benefits is equal to the PVVAB (as calculated by our actuarial valuation system) minus the value of assets in the pension trust, i.e. the assets in the systems as of the Petition Date. In other words, once I had determined the PVVAB, I simply needed to subtract the value of the assets in the retirement systems as of the Petition Date to determine the UPVVAB.

One important point to note is that, in order to calculate the claim amount, I needed to use a discount rate to discount the future liability amounts to present value. As I will discuss in detail in the next section, I used a 7.5% discount rate in valuing the claim rather than the 6.75% discount rate used by the City. All other assumptions I used are the same as those used in Gabriel's valuations¹².

D. Determination of the Appropriate Discount Rate For Valuing the Pension Claims

To calculate the PVVAB, I had to determine an appropriate discount rate. In the public pension industry, for purposes of calculating claim amounts, the appropriate discount rate traditionally reflects expected investment returns in the future. While there is some academic debate on this topic, as highlighted in the report of Martha Kopacz, the Court's Feasibility Expert, there generally remains *uniform* practice in my industry to use an investment-return based discount rate when valuing public pension liabilities.

I chose a discount rate of 7.5% based on a combination of tools including: analysis of industry comparable rates, review of sample asset allocations, estimates of future investment returns by asset class, review of the pension systems' investment policies, analysis of historical data, portions of the Actuarial Standards of Practice, and my own experience in the industry. I discuss several of those factors below:

Investment Policy

I analyzed the documented investment policy of GRS¹³ and PFRS as well as other documents produced by the City listing historical investment targets and rates of return for each retirement system¹⁴. The investment policy of GRS sets "the nominal return objective for that System at 8.40%, net of investment management fees (7.9% actuarial return, net of all expenses + 0.25% for administrative costs + 0.25%)."¹⁵ PFRS has an

¹² Inasmuch as the City stipulates that the proposed ASF Recoupment provision is to decrease benefits and that the annuity savings fund amounts are to correct benefits that should never have been paid, the claim amounts that I have calculated have been decreased by those amounts. Since the City is only recouping a portion of the overpayments, I have included that difference into the calculation of the recovery amounts.

¹³ Investment Policy Statement for GRS, (III.2 Statement of Goals and Objectives), March, 2013.

¹⁴ General Retirement System and Police and Fire Retirement System Table of Actuarial Assumed Rates of Return, available at POA00602884.

¹⁵ Investment Policy Statement for GRS, (III.2 Statement of Goals and Objectives), March, 2013.

investment return objective of 8.0%, net of all fees.¹⁶ The GRS Investment Policy also requires the plan manager to choose a prudent asset allocation, target a realistic return, and consistently monitor performance.¹⁷ I find investment policies to be significant data points in considering proper investment rates of return because the plan managers are fiduciaries who are bound by law and are often charged with the fiduciary duty to invest prudently - which requires diversification, analysis of necessary cash flows, and investment that is neither too aggressive nor too conservative.¹⁸ Documents provided by the City show that GRS and PFRS have frequently exceeded the target returns included in the Investment Policy Statements and that the average annual returns for GRS over the past 25 years were slightly in excess of 8.0%.¹⁹ I also reviewed documents suggesting the average returns for pension plans to be roughly 9.0% over the past 25 years.²⁰

While I view a Plan's investment policy to be a highly useful data point, I believe that best practices require the analysis of multiple data points. Thus, I looked at a variety of additional sources in forming my opinion of an appropriate range for target investment returns.

Actuarial Standards of Practice

I reviewed several relevant Actuarial Standards of Practice, including:

"To evaluate relevant data, the actuary should review appropriate recent and long-term historical economic data, and the actuary should not give undue weight to recent experience."²¹

An assumption is reasonable if it reflects the actuary's professional judgment, and if it takes into account historical and current economic data that is relevant as of the determination date."²²

¹⁶ 7/9/2014 Thomas Dep. Tr. at 52:1-4; 7/25/2014 Perry Dep. Tr. at 133:23-25.

¹⁷ GRS Investment Policy.

¹⁸ 7/9/2014 Thomas Dep. Tr. at 59:4-14; Mich. Comp. Laws Ann. § 700.1502 (Michigan Prudent Investor Rule).

¹⁹ General Retirement System and Police and Fire Retirement System Table of Actuarial Assumed Rates of Return, available at POA00602884.

²⁰ NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, Updated April 2014.

²¹ Actuarial Standards of Practice No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations), Section 3.4.

²² Actuarial Standards of Practice No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations), Section 3.6.

Asset Allocation and Historical Returns

Return on investment is largely tied to asset allocation. Generally speaking, as a plan invests more aggressively, it expects higher returns because it is taking on greater risk and volatility. As a Plan invests more conservatively, it expects lower returns while reducing risk and volatility.

As of the Petition Date, the target asset allocations, as percentages of total assets, in GRS and PFRS are as follows:

TABLE 1

Asset Class ²³	PFRS	GRS
Equity	38.0%	51.0%
Fixed Income	25.5	24.0
Cash	1.0	1.0
Private Equity	10.0	6.0
Real Estate	15.5	13.0
Energy MLP	5.0	0.0
Hedge Funds	<u>5.0</u>	<u>5.0</u>
Total	100.0%	100.0%

As pointed out in Mr. Alan Perry's deposition, the asset allocations for both GRS and PFRS fall within a normal range, when compared to at least 100 of the largest public pension funds in the US.²⁴

Once I obtained the asset allocations for the retirement systems, I performed a review of historical investment returns by asset class²⁵, and I determined a compounded average annual rate of return. The average was by asset class using data over the period from 1926 to 2013 for the first four categories listed above and varying periods for private equity (25 year period ending September 30, 2013), real estate (1999 to 2013), Energy MLP (1998 to 2013) and hedge funds (1994 to 2013). The average annual rates of return during the selected periods are as follows:

²³ Risk Parity is included in Fixed Income.

²⁴ 7/25/2014 Perry Dep. Tr. at 61:14–18; 118:19–25; 119:1–11; 137:1–14; 158:14–18.

²⁵ Ibbotson SBBi 2013 Valuation Yearbook for Equity and Fixed Income.

Large company stocks – 10.1%
Small company stocks – 12.3%
Long-term corporate bonds – 6.3%
Long-term government bonds – 5.2%
Private Equity – 13.4%²⁶
Real estate – 4.2%²⁷
Energy MLP – 8.9%²⁸
Hedge Funds – 10.4%²⁹

When the above averages are applied to asset allocations for the pension systems, an expected rate of return of 8.7% is calculated for GRS and 8.4% for PFRS (net of 0.1% investment management fees). In developing my expected rate of investment return, I applied two-thirds of the large company stock average of 10.1% and one-third of the small company stock average for equities of 12.3%; two-thirds of the long-term government bond average of 5.2% and one-third of the long-term corporate bond average of 6.3% for fixed income as these allocations closely relate to the allocations in both GRS and PFRS and provide a reasonable calculation of expected returns, based on current target asset allocations. The determination of average historical returns is one of many tools I used to create a range of reasonable discount rates.

Based upon the documents that I have reviewed, I am not aware of any changes that have been made to the asset allocations illustrated above, and after reviewing deposition testimony by the Executive Director of GRS and PFRS as well as the City's expert on discount rates, I feel confident that there have been no changes to those asset allocations nor any planned future changes to the same³⁰.

Industry Surveys

I also researched a variety of additional benchmarking sources that would be useful in my arriving at an appropriate selection of an investment return rate.

²⁶ Cambridge Associates, LLC U.S. Private Equity Index.

²⁷ MSCI US REIT Index.

²⁸ Alerian MLP Index.

²⁹ HEDGNAV Index.

³⁰ 7/9/2014 Thomas Dep. Tr. at 37-38; 7/25/2014 Perry Dep. Tr. at 37:1-10; 62:24-63:15.

- Based on one widely-used industry survey³¹, the 2012 median expected long-term rate of return on pension assets for 2012 was 7.75%. This survey collected rate of return assumptions in pension plans for 100 companies, comprised of Fortune 100 and other large, well-established companies.³²
- A widely-used public pension database³³ determined that the 2012 median investment return assumption was 8.0%. The supporting database collected information from 126 state and local pension plans.
- A widely-used Issue Brief³⁴ indicated that the median investment assumption was 7.75%. The data used for this Issue Brief was developed from the Public Fund Survey, sponsored by the National Association of State Retirement Administrators and the National Council on Teacher Retirement. An update of the Issue Brief³⁵ indicates that, as of December 2013, the median investment assumption remained at 7.75%.
- I reviewed the report of the City's Feasibility Expert. Ms. Kopacz found, consistent with my review, that the average assumed investment return for public pensions was 7.72%.³⁶
- I also reviewed a variety of widely-used public pension studies performed by the City's appointed actuary, Milliman. These studies present a median investment return for large public pension funds of 7.75% in 2013, a 0.25% rate decrease from 2012.³⁷ The 2012 Milliman Study also demonstrated that very few of the largest pension plans (approximately 10%) targeted their investment returns below 7.5%, and more than 75% of those plans used investment rate assumptions of 7.75% or greater.³⁸ The 2012 Milliman Study indicated that nearly 50% of the largest pension plans allocated 70% or more of its assets outside of fixed income (as is the case with both GRS and PFRS).³⁹
- The 2012 Milliman study gave a breakdown of the aggregate asset allocation for the 100 largest pension plans, and the 2013 Milliman study indicated that there had not

³¹ Price Waterhouse Coopers (PWC) Pension/OPEB 2013 Assumption and Disclosure Survey.

³² Although this study is limited to Fortune 100 companies, the process used by private companies to determine their plans' rates of return is the same as I have used in my analysis.

³³ Boston College Public Pension Database *available at* <http://crr.bc.edu/data/public-plans-database/>.

³⁴ NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, December 2013.

³⁵ NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, Updated April 2014.

³⁶ Expert Report of Martha Kopacz at 135.

³⁷ Milliman 2013 Public Pension Fund Study; Milliman 2012 Public Pension Fund Study.

³⁸ Milliman 2012 Public Pension Fund Study at Figure 8.

³⁹ Milliman 2012 Public Pension Fund Study at Figure 3.

been a significant change to that asset allocation.⁴⁰ The asset allocation listed was substantially similar to the allocations for the PFRS and GRS.⁴¹ Additionally, the City's expert, Alan Perry, confirmed that the PFRS and GRS asset allocations were fairly typical for large pension plans and not particularly aggressive or conservative.⁴² This further supported my opinion that the Detroit Retirement Systems investment return should be close to the median of the largest pension plans, rather than at 6.75% which represented an outlier at the extreme low-end of the largest pension plans illustrated in the Report.

- Throughout my review of other pension plans, I consistently found that 6.75% was an outlier that was not consistent with the investment policies of large public plans, historical returns for pension plans, or the asset allocations at issue.

Risk-Free Rate of Return

It has been suggested in other expert reports that the appropriate discount rate to be used for claims determinations is based on a risk-free rate of return. Although a pension determination based on risk-free rates of return may be appropriate in some circumstances (e.g., private pension plan terminations as valued by the Pension Benefit Guaranty Corporation), the use of risk-free rates for the determination of bankruptcy claims for an ongoing public pension plan is unreasonable. Indeed, I am not aware of a single instance where the risk-free rate has been used for determining the liability for a public pension plan. Nor is the City's discount rate expert.⁴³

Conclusion on Discount Rates

Taking all of the above analysis into consideration, even after current data suggests that assumed investment returns for many large defined benefit plans have been lowered over the last year⁴⁴, it is my expert opinion that an appropriate range for an investment return assumption, as of the Petition Date, and based on the asset allocations for GRS and PFRS, is 7.5% to 8%. It is significant to note that the use of a 7.5% discount rate is at the lowest end of this range. It is, therefore, my opinion that the City's proposed investment return assumption included in the Plan (i.e., 6.75%) is outside the range of reasonableness.

⁴⁰ Milliman 2013 Public Pension Fund Study; Milliman 2012 Public Pension Fund Study.

⁴¹ Compare the asset allocation at 2012 Milliman Public Pension Fund Study to the asset allocations above or those contained in the expert report of Alan Perry.

⁴² 7/25/2014 Perry Dep. Tr. at 61:14–18; 118:19–25; 119:1–11; 137:1–14; 158:14–18.

⁴³ 7/25/2014 Perry Dep. Tr. at 162:5–163:4.

⁴⁴ Milliman 2013 Public Pension Fund Study.

As discussed above, having determined the appropriate (though conservative) discount rate of 7.5%, I applied that discount rate when calculating the UPVVAB (based on available data) to arrive at what I believe to be the appropriate claim amount for GRS and PFRS claim holders.

E. Recovery Amounts

Having determined the appropriate amount of the Class 10 and Class 11 claim amounts, I then performed an analysis of the recoveries that would be distributed to Class 10 and Class 11 under the Plan in order to ultimately determine a “recovery percentage” for those Classes.

The recovery amount is the present value of the property distributed to Classes 10 and 11 on the PFRS and GRS claim amounts. The property to be distributed to GRS and PFRS is comprised of the contributions made by the City from the following sources – City general fund, State of Michigan, DIA proceeds, UTGO⁴⁵ settlement (non-income stabilization - GRS only) and DWSD⁴⁶ contributions (GRS only). For purposes of my analysis, I relied on all future contribution amounts to be deposited into GRS and PFRS as is provided in the City’s Plan⁴⁷.

The City’s contributions to the plans that are due over the next ten years are set amounts designated by the Plan.⁴⁸ Those contributions include funds provided to the City for pension purposes from the State of Michigan, the DIA, UTGO settlements to GRS, DWSD and the City’s General Fund. All of these contribution amounts are consistent with those designated in the City’s Plan.

There are two sources of recovery not recognized in the City’s Plan. The first source is the UTGO settlement money that is being directed to the income stabilization fund. Those contributions will be used to increase benefits for certain GRS and PFRS participants whose household income falls below 105% of the poverty level.⁴⁹ Those amounts should be included in the GRS and PFRS recoveries because funds are being contributed directly into GRS and PFRS to increase benefits that were otherwise decreased by the City’s Plan. The City provided no justification for not including those amounts in the Plan. I assumed that 50% of those funds would be contributed to each GRS and PFRS.

⁴⁵ Unlimited Tax General Obligation Bonds.

⁴⁶ Detroit Water and Sewer District.

⁴⁷ Once I became comfortable with the contribution amounts determined by Milliman, as discussed in the previous section, *supra* Part D.

⁴⁸ As discussed in more detail below, because the Plan has established set contributions until 2023, the City should be willing to invest, if anything, more aggressively (higher returns and more volatility) as cash flow needs will not arise until after 2023.

⁴⁹ Fifth Amended Plan of Adjustment [Doc. No. 6257] at 50.

The second set of contributions, not included in the City's Plan, are pension restoration payments for investment income amounts greater than 6.75%. To determine those amounts, I projected the asset and liability amounts from 2014 to 2023. For each year, as discussed in detail above, I assumed that the annual investment return on assets would be 7.5%. As explained in the City's Plan, investment returns in excess of 6.75% are treated as a pension restoration and recovery.⁵⁰

For the period from 2014 to 2023, the GRS funded percentage needs to be greater than 75% in order for a pension restoration to apply. Under that test, I projected that pension restorations for GRS will occur in years 2018–2023. Due to the higher funded percentage threshold for PFRS⁵¹, I projected that pension restorations for PFRS will occur in all years from 2014 to 2023.

In 2024, the funded percentage requirements for both plans is higher, and as a result, pension restorations were not projected to occur after 2023 for either GRS or PFRS.

After 2023, the contribution requirement from the City's General Fund is the net amount (after subtracting DIA funds) of the amount required to eliminate the unfunded liabilities in 2023 over a 30-year period. With regard to both plans, I determined the unfunded amount as of 2023, as presented by the City's Plan, to be reasonable.

Again utilizing common industry practice, I was also able to replicate and match the post-2023 unfunded liability amortization payments for both plans, as prepared by the City's actuary. Therefore, with the exception of the UTGO and restoration payments that were erroneously ignored, all contribution amounts used in my recovery calculation match those in the City's Plan.

Once all projected contributions were determined, I then calculated the present value of those contributions. Consistent with the City in its Plan, I used a different discount rate for claims and recovery purposes. For *claims* purposes, I determined a pension liability using the benefits accrued as of the Petition Date. As is typical and standard practice in the public pension actuarial profession, I used the assumed rate of investment return based on the asset allocations (as of the date of determination) as the discount rate (See *infra* at Section IV.D). For purposes of the present value calculation of the *recovery* amounts, I used the same 5% discount rate as was used by the City for all City and DWSD generated contributions.⁵² For State and DIA contributions, I used an AA municipal bond yield curve which is consistent with the testimony of Kenneth Buckfire during his deposition.⁵³

⁵⁰ Fifth Amended Plan of Adjustment [Doc. No. 6257], Ex. II.B.3.q.ii.C; Ex. II.V.3.r.ii.C.

⁵¹ The City's Plan states that for PFRS to provide restorations, the plan's funding percentage must be above 78%.

⁵² Fourth Amended Disclosure Statement [Doc. No. 4391], Exhibit 2 to Exhibit K.

⁵³ Average of AA+ and AA- GO Municipal Bonds on July 22, 2014.

Recovery Calculation

Once I determined the claim and recovery amounts, determining the recovery percentage logically follows. Consistent with the City's Plan, the recovery percentage is simply the recovery amounts divided by the claim amounts.

$$\frac{\text{Present Value of Property Distributions}}{\text{Claim Amounts}} = \text{Recovery Percentage}$$

As I will discuss in more detail below, I found the Recovery Percentage for both the PFRS and GRS Claims to be substantially higher than those Recovery Percentages listed in the Plan.

V. BASIS OF OPINIONS RE CLAIM RECOVERY PERCENTAGE

In the City's Plan of Adjustment, it estimates a recovery percentage of 59% for Class 10 (PFRS), and 60% for Class 11 (GRS).⁵⁴ These numbers significantly understate the recovery percentages going to Classes 10 and 11 due to six incorrect assumptions used in the City's calculation of the recovery percentage.

Problems with the City's Claim Recovery Calculation:

1. The Class 10 and 11 claim amounts were calculated using an improper funding methodology, thus inflating the size of the Claim Amount;
2. The City improperly includes non-vested benefits in calculating the Class 10 and 11 claim amounts;
3. The City discounted the Class 10 and 11 claim amounts at an artificially low discount rate, causing the claim amounts to be artificially inflated;
4. The City inexplicably failed to include distributions going to Classes 10 and 11 from the UTGO Income Stabilization Fund;
5. The City assumed an artificially low investment return rate for Class 10 and 11 recoveries; and
6. The City failed to apply its own expert's lower discount rate for recoveries associated with DIA and State Settlement funds.

The remainder of this Section will discuss each of these problems in more detail and demonstrate the impact each problem had on the claim recovery percentage. When each of these problems is corrected, the recovery percentages are correctly stated at 116% and 117% for PFRS and GRS respectively.

A. Problem 1: The City's Use of the Entry Age Normal Funding Methodology on a Frozen Plan Caused The Pension Claim Amounts as Calculated by the City to be Substantially Inflated

Plan actuaries use a variety of funding methodologies to determine the actuarial accrued liability ("AAL") and unfunded actuarial accrued liability ("UAAL"). It is common practice in the actuarial profession for *ongoing* public defined benefit plans to employ an actuarial funding method identified as Entry Age Normal to determine the actuarial accrued liability and present value of future normal costs. Fundamentally, in an ongoing

⁵⁴ Fourth Amended Disclosure Statement [Doc. No. 4391] at 37–40. These amounts include, per the Plan, "Outside Funding." Those amounts are recoveries that are going to Classes 10 and 11, and I have been instructed by counsel to include them in my calculations. I have also provided tables in Appendix D that show the recovery rates without those funds included.

defined benefit plan, the present value of future benefits is determined by projecting future salary increases and years-of-service to an expected retirement date. The present value of future benefits is then split into two segments – one representing benefits earned in the past (i.e., actuarial accrued liability) and one representing benefits projected to be earned in the future (i.e., present value of future normal costs).

The actuarial accrued liability under Entry Age Normal is based on a benefit with future salary increases being projected. This actuarial funding method is helpful in keeping a plan sponsor's contribution level as a percentage of salary; however, once a plan is frozen, a modified version of the Entry Age Normal method must be applied⁵⁵. Specifically, when benefit accruals in a plan are frozen as of a specific date, it is no longer appropriate to use the Entry Age Normal Funding Method (as applied by the City) for developing ongoing contribution requirements or liabilities under the Plan, since it utilizes a normal cost for those purposes:

“When a plan has no active participants and no participants are accruing benefits, a reasonable actuarial cost method will not produce a normal cost for benefits.”⁵⁶

Thus, a normalized funding methodology may not be realistic for calculating a claim. This is because a pensioner becomes entitled to more and more of his/her benefit later in his/her career due to future salary and service increases, even though those salary and service increases may not yet have actually occurred. When using a normalized funding methodology, one assumes those benefits accrue proportionately, year-by-year. When a plan is frozen or fixed as of a date certain (e.g., as of the Petition Date), the Entry Age Normal funding method (the version used in the City's Plan) will significantly overstate the liability amount actually owed to a pensioner in many instances.

As an example, if a defined benefit plan participant depicted in Graph 1 below⁵⁷ were to have his/her benefits frozen at age 45, the participant would be entitled to the present value of that accrued benefit (approximately \$55,000). He or she would not be entitled to the accrued liability under the Entry Age Normal funding method as used by the City (approximately \$122,000). In other words, the EAN funding method improperly counts future salary increases that had not occurred and would not occur.

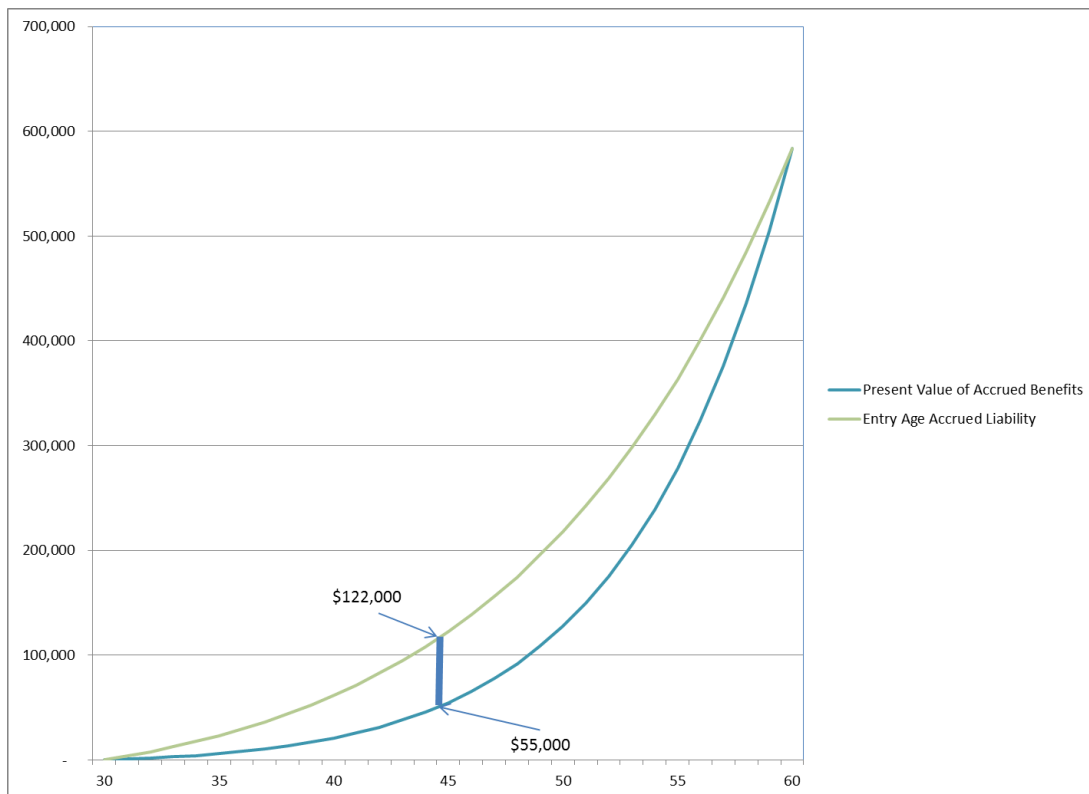
⁵⁵ Actuarial Standards of Practice No 4, Section 3.13.a.

⁵⁶ Actuarial Standards of Practice No. 4, Section 3.11.

⁵⁷ Graph 1 illustrates the progression over time of the accrued liability using the Entry Age Normal funding method for an ongoing plan in relation to the present value of accrued benefits (i.e., the accrued liability for Entry Age Normal for a frozen plan) from entry age (assumed to be age 30) to retirement age (assumed to be age 60). The reason for this banana-shaped graph is that the Entry Age Normal funding method provides for a levelling of contributions, as a percentage of salary, over an employee's lifetime. The area between the two curves illustrates why the City's calculation of the claim amounts is inflated as the Entry Age Normal method accrues benefits not yet earned.

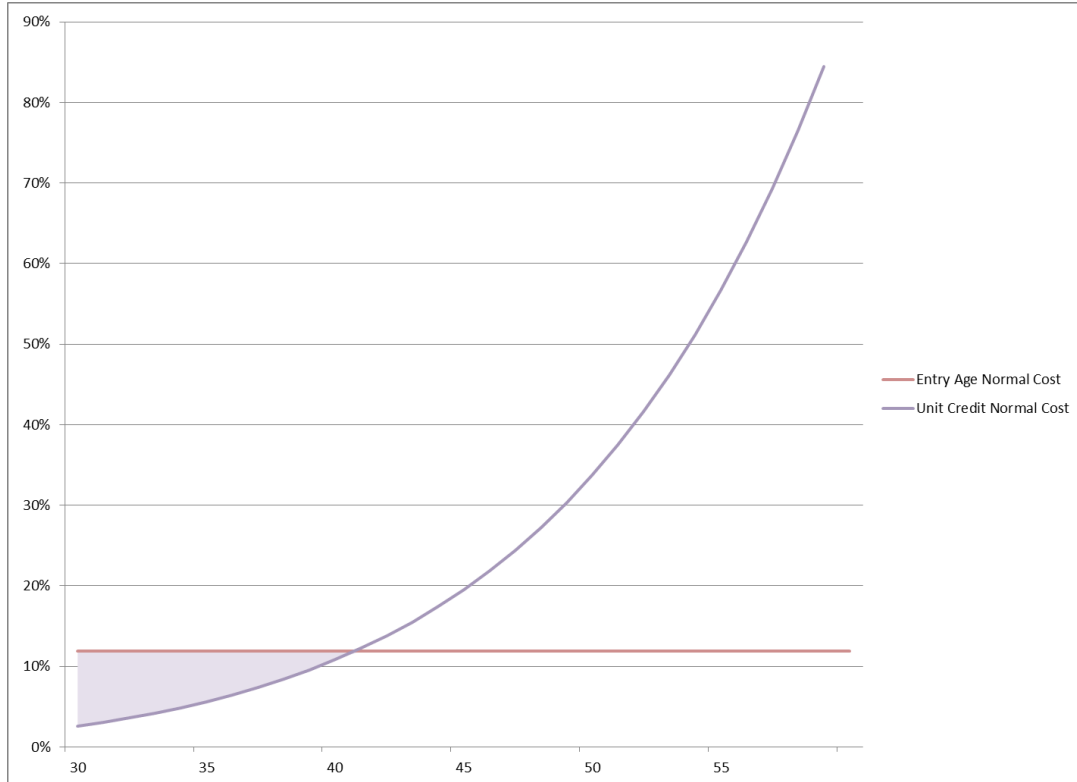
Since the claim amount is determined as of a specific date (e.g., as of the date of the plan freeze), with no future benefit accruals or increases due to salary increases, using the present value of accrued benefits is the more appropriate approach in calculating the claim amount. And using the Entry Age Normal method would cause the claim amount to be overstated by \$67,000 for the participant in question.

GRAPH 1



The higher Entry Age Normal accrued liability is due to the higher Normal Cost developed during a participant's early years of service. It is not directly related to benefits being earned at any point before retirement (which is comparable to a claims determination), but is merely used as an appropriate budgeting tool for funding a plan. Graph 2 shows how the City determined its pension claim amounts, improperly applying the Entry Age Normal methodology as if the plans were expected to be ongoing plans, not frozen as of the Petition Date. The shaded gap between the straight line and the curved line indicates excess benefits being credited towards an active pensioner that have not yet been earned and should not have been included for purposes of calculating a claim amount.

GRAPH 2



It is clear after reviewing available data, as well as the deposition of Milliman's Glenn Bowen that the City used the Entry Age Normal funding methodology when calculating the claim amount for this purpose.⁵⁸ As discussed above, this would be appropriate for an ongoing pension plan, but not for a frozen pension plan, and is not appropriate for calculating the claim amount as of the Petition Date. Because the calculations were performed while the plans were contemplated to remain ongoing,⁵⁹ the effect of the City using the wrong assumption is to substantially overstate the claim amount by including amounts not actually owed to the pensioner as of the Petition Date.

Table 2 indicates the effect on the claim amounts and recovery amounts for GRS and PFRS after this mistake is corrected:

⁵⁸ 6/30/2014 Bowen Dep. Tr. at 200:5–19.

⁵⁹ 6/30/2014 Bowen Dep. Tr. at 118:19–23.

TABLE 2

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan*	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%

*Due to the City's assertion that the excess interest from the Annuity Savings Fund was improperly credited, and eligible for recoupment, we have decreased the City's claim by \$387 million (the value of the ASF recoupment). As a result, in the first line on Tables 2 through 7 for GRS, the Claim and Recovery Percentages do not match the amounts shown in the City's Plan.

B. Problem 2: The City Improperly Included Non-Vested Funds

The City also overstated the claim amounts for Classes 10 and 11 by including non-vested benefits in the calculation of those claims amounts.

The claim amount is equal to the present value of the benefits to which participants are entitled. More specifically, participants are only entitled to benefits to which they are vested. It is, therefore, my opinion that the present value of accrued benefits for those participants not yet vested should not be included. For these fundamental reasons, it is also my opinion that the claim amount should be the unfunded amount of the present value of vested accrued benefits ("UPVVAB") as of the Petition Date. By excluding the non-vested benefits, corrected claim and recovery amounts are illustrated in Table 3 as follows:

TABLE 3

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%

C. Problem 3: The City Utilized an Unreasonable Discount Rate When Valuing the Claim Amount

In order to properly determine the PVVAB, an appropriate discount rate must be selected.

One of the most significant assumptions for the actuary to select is the discount rate. Knowing that multiple participants will have benefits payable in the future, a

reasonable discount rate needs to be adopted to determine the present value of those benefits. The selection of an appropriate investment return assumption is critical because the lower the discount rate, the higher the PVVAB, which ultimately leads to artificially inflated pension claim amounts.

As discussed above in my “Summary of Methodology” Section, it is my opinion that the most appropriate discount rate for purposes of this analysis falls within the range of 7.5% to 8.0%. To be conservative in granting my opinion, I selected the lowest end of that range, specifically 7.5%, in performing my calculations. The City specified a discount rate of 6.75% to use in the Plan. For the reasons discussed above, it is my opinion that the use of a 6.75% discount rate is unreasonable.

Table 4 shows the impact on the calculation of the claim amounts if the more appropriate discount rate of 7.5% is used to determine the present value of expected future benefit payments.

TABLE 4⁶⁰

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%
7.5% Discount Rate	1.018	1.118	109.8%	0.795	0.735	92.5%

As mentioned above, the 7.5% discount rate is at the low end of the range. I have determined recovery percentages using the target rate of 7.9% for GRS and 8.0% for PFRS. Those calculations are in Appendix D.

D. Problem 4: The City Failed to Include All Recovery Amounts In Its Calculation of Class 10 and 11 Recoveries.

The previous three problems with the City’s recovery percentage calculation related to an improper valuation of the Class 10 and 11 claim amounts. Not only does the City’s Plan substantially overstate the Class 10 and Class 11 claim amounts, but it also substantially understates Class 10 and Class 11 recovery amounts. The recovery amounts are equal to the present value of the property distributed to claimants on account of the GRS and PFRS claim amounts. First, the Plan excludes certain property paid to claimants on account of their claims. Second, the Plan assumes an unreasonably low rate of return on its investments and, thus, excludes the value of restored benefits. Third, the City, in its Plan, utilizes an inappropriately high discount rate in determining

⁶⁰ Based on a 7.5% discount rate, the PVVAB for active workers is approximately 16% of the total PVVAB for GRS and 14% for PFRS.

the present value of property distributed to claimants. Each of those errors artificially deflates the value of the property distributed to GRS and PFRS claimants.

There are two sources of recovery not recognized in the City's Plan. The first source is the UTGO settlement money that is being directed to the income stabilization fund. Those contributions will be used to increase benefits for certain GRS and PFRS participants whose household income falls below 105% of the poverty level.⁶¹ The benefit increases afforded as a result of the UTGO settlement replace some of the benefits otherwise decreased by the City's Plan. I relied upon the City's disclosure statement for the annual amounts allocated to the income stabilization fund. These amounts should be included in the GRS and PFRS recoveries and it is unclear why the City did not include those amounts in the Plan. The City's Plan shows a portion of the UTGO settlement funds going into GRS, and is included in the City's recovery calculation, but the UTGO settlement funds going into the income stabilization fund are mistakenly not included.

The amount of income stabilization funds directed to individual participants will vary due to individual income levels; which, in turn, creates different allocation amounts between GRS and PFRS. The City did not provide data that enabled me to allocate the UTGO settlement funds, so I assumed that 50% of those funds would be contributed to each GRS and PFRS.

The impact of including these funds in the calculation of the recovery amounts is illustrated in Table 5 below:

TABLE 5

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%
7.5% Discount Rate	1.018	1.118	109.8%	0.795	0.735	92.5%
Include UTGO Income Stab Fund	1.018	1.126	110.6%	0.795	0.743	93.5%

E. Problem 5: The City Utilized An Unreasonably Low Investment Rate When Determining Investment Returns for Classes 10 and 11.

The assets within a pension system are invested according to the asset allocation of that pension system. Thus, the greater the return on those investments, the better funded the pension system will be. The most recent Plan assumes that the future expected investment return will be 6.75%. For reasons discussed in Section A of this report, this

⁶¹Fifth Amended Plan of Adjustment [Doc. No. 6257] at 50.

assumption is not consistent with the PRFS or GRS asset allocation, industry comparable data, historical returns, or of the systems' documented investment policies. It is my expert opinion that a more appropriate (though conservative) investment return assumption would be 7.5%.

One additional note regarding the investment return assumptions for Classes 10 and 11. The City claims that, to reduce untenable volatility, less investment risk must be taken by the pension funds. However, for the next nine years (through 2023), The City is scheduled to make very small contributions to GRS and none to PFRS.⁶² All of these contributions scheduled to be made through 2023 will be fixed dollar amounts, not subject to volatility normally seen in the funding of defined benefit plans. It is only beginning with 2024 that the City is obliged to make contributions to the plans at a level that will fully fund the unfunded actuarial accrued liability ("UAAL") while being amortized over the next 30 years. Thus, the retirement systems are actually in a unique position, if anything, to invest more aggressively (i.e. take on more volatility in order to gain higher returns) over the next nine years.

The impact of using the more appropriate 7.5% on investment returns in calculating claim amounts is illustrated in Table 6 below:

TABLE 6

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%
7.5% Discount Rate	1.018	1.118	109.8%	0.795	0.735	92.5%
Include UTGO Income Stab Fund	1.018	1.126	110.6%	0.795	0.743	93.5%
ROR Assets 7.5%	1.018	1.155	113.4%	0.795	0.887	111.6%

F. Problem 6: The City Ignored Its Own Expert and Overstated the Discount Rate Associated with DIA and State Settlement Funds.

Finally, the discount rate used in calculating the present value of the distributions that will be made to Classes 10 and 11 must be considered. As discussed above, in the field of public pension actuarial science, the discount rate used to present value *a claim amount* (i.e. an unfunded liability) is typically the same as the assumed investment return. As the City's Feasibility Expert noted, there is a developing divide within the profession whether it is more appropriate to use a market-based discount rate as opposed to an investment-return-based discount rate for calculating the present value of the unfunded accrued actuarial liability. However, that discussion is still academic as

⁶² Only attributable to GRS.

of now, and I am not aware of any instances in which a market-based, or risk-based, discount rate has been used for determining the present value of the unfunded accrued actuarial liability for a public pension fund. Thus, consistent with current best practices in the actuarial profession, I have used the investment-return approach in preparing my calculations.⁶³

However, as the City acknowledges in both its Plan⁶⁴ and the testimony of Kenneth Buckfire,⁶⁵ it is appropriate to apply a market-based discount rate when determining the present value of the *recovery amounts* (as opposed to the *claim amounts*). The City and Mr. Buckfire support a discount rate of 5% to present value the recovery of amounts being contributed by the City.

As Mr. Buckfire testified, however, a lower discount rate should be applied to the distributions to Classes 10 and 11 that are coming from the State Settlement and DIA Funds. Mr. Buckfire testified that a 2%-4% discount rate would be more appropriate in that context.⁶⁶ As an additional data point in support of Mr. Buckfire's testimony, I have reviewed discount rate curves for AA rated corporate bonds as a comparison to the funds from the State Settlement and the DIA, which are consistent with Mr. Buckfire's 2%-4% testimony. Applying Mr. Buckfire's lower discount rate for distributions to Classes 10 and 11 from the State Settlement and the DIA causes Class 10 and Class 11 recoveries to be higher and leads to larger recovery amounts as illustrated in Table 7 below:

TABLE 7

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%
7.5% Discount Rate	1.018	1.118	109.8%	0.795	0.735	92.5%
Include UTGO Income Stab Fund	1.018	1.126	110.6%	0.795	0.743	93.5%
ROR Assets 7.5%	1.018	1.155	113.4%	0.795	0.887	111.6%
Buckfire Discount Rates for Dist	1.018	1.187	116.6%	0.795	0.921	115.9%

Based on my expertise in the industry, my review of relevant data and testimony, and the opinions in this report, I believe that the bottom row of Table 7 would be most

⁶³ I note that Ms. Kopacz did not undertake an effort to determine what a risk-based discount rate would have been for the City as of the Petition Date. Given the risk associated with the City's ability to make payments to the Retirement Systems as of the Petition Date, I view 7.5% as likely conservative, and perhaps considerably lower, than the market-based rate that would have existed as of the Petition Date.

⁶⁴ Fourth Amended Disclosure Statement [Doc. No. 4391], Exhibit 2 to Exhibit K.

⁶⁵ 7/16/2014 Buckfire Dep. Tr. at 206:4–10.

⁶⁶ 7/16/2014 Buckfire Dep. Tr. at 171:18–14.

appropriate to use in estimating the recovery percentages for Classes 10 and 11. *Thus, I conclude that the actual recovery percentages under the Plan are 117% for GRS and 115% for PFRS.*⁶⁷

VI. BASES FOR ADDITIONAL OPINIONS

A. City's Calculation of its OPEB Claim is Overinflated and Unreasonably High

In addition to classes for GRS and PFRS claims, the City has established a separate class for holders of OPEB claims in the Plan. Though I was afforded little background into the OPEB claims and the settlement between the City and the OPEB claim holders, it appears that the OPEB claim has been significantly overstated in the Plan for the following reasons:

1. The OPEB Claim Has Increased Dramatically From Plan to Plan

The City of Detroit, Michigan ("The City") entered into bankruptcy on July 18, 2013 under the provisions of Chapter 9 of the US Bankruptcy Code. Of the \$18 billion in claim amounts listed by the City as of that Petition Date, the City's initial filing as of that same date, listed pension claim amounts of approximately \$3.5 billion and OPEB debts of approximately \$5.7 billion⁶⁸.

After the Petition Date, the pension and OPEB claim amounts have been modified by the City multiple times. In the City's initial Plan, OPEB claim amounts were, as a matter of preference, combined with the pension claim amounts⁶⁹. Total PFRS claim amounts were \$3.2818 billion (\$1.6938 billion for PFRS OPEB and \$1.588 billion for PFRS pensions). Total GRS claim amounts were determined to be \$3.790 billion (\$1.491 billion for GRS OPEB and \$2.299 billion for GRS pensions). Thus, OPEB claim amounts totaled \$3.185 billion. The OPEB claims were to be further reduced by any federal government subsidies applied toward the payment of health insurance premiums provided under the Patient Protection and Affordable Care Act or any other federal governmental health care plans. The discount rate used to develop the OPEB claim amounts was not disclosed.

The City filed an amended Plan on March 31, 2014. In this filing, OPEB claims were aggregated between GRS and PFRS members, though in this version, the City separated the OPEB claims from the pension claims. Presented as a separate class, the

⁶⁷ While I believe that my assumption is more appropriate than the city's assumption in each of the six cases, I have included additional charts that break down the change to Recovery Percentage associated with each of the City's assumptions that I have challenged in Appendix D.

⁶⁸ City of Detroit Proposal for Creditors Executive Summary, June 14, 2013, pp 19–20.

⁶⁹ All subsequent Plans separated pension and OPEB claims.

OPEB claims remained \$3.185 billion. The discount rate for OPEB claims remained undisclosed.

The City filed its second amended Plan on April 16, 2014. In that filing, but without substantiation, OPEB claim amounts were increased to \$3.334 billion, and the discount rate used for calculating the OPEB claim amounts remained undisclosed.

The City then filed a third amended Plan on April 25, 2014, and the OPEB claim increased (again, without substantiation) to \$4.095 billion, while the discount rate used for calculating the OPEB claim amounts remained undisclosed.

Finally, the City filed its fourth amended Plan on May 5, 2014. Once again, the OPEB claim amount increased, this time to \$4.303 billion and was the result of a settlement between The City and the court-appointed Retiree Committee. It is our current understanding that the City and the Retiree Committee negotiated a discount rate of 4.0% to be used for the OPEB claim, but further terms of the OPEB settlement remain unavailable.

In summary, the OPEB claim amount has risen by more than \$1.1 billion from the City's first Plan to the current version of the Plan. I have not been furnished with any documentation supporting why the City adjusted the OPEB claim by so much, but I view a 25% adjustment to the claim in just over a month as a red flag regarding the reliability of the City's OPEB claim amount.

2. The City Has Inflated The OPEB Claim Amount By Erroneously Including Post-Petition Retirees

The City's OPEB claim amount take into account benefits owed to retirees up to and including December 31, 2014. Counsel for Syncora has instructed me to analyze how much of the \$4.303 billion claim amount constitutes benefits owed to retirees who would have retired after the Petition Date but before January 1, 2015.

As stated above, the information available to me has been insufficient to determine exactly how the City calculated the amount of benefits owed. However, I have been able to estimate that approximately 865 of the current retirees included in the OPEB claim amount actually retired *after* the Petition Date. Based on my review of the limited information, I have concluded that those 865 retirees would constitute at least \$185 million of the claim amount presented by the City.

My estimate was determined by starting with the 352 GRS and 225 PFRS participants who retired after July 18, 2013⁷⁰ and projecting that the total number of retirees after July 18, 2013 would be 528 for GRS and 338 for PFRS as of December 31, 2014.

⁷⁰ In Excel spreadsheet sent by Clark Hill to Syncora's counsel on June 10, 2014.

I then used the average present value of benefits for retirees from the OPEB actuarial valuation as of June 1, 2011, and increased the average with two years of medical inflation (as assumed in the valuation⁷¹). This produced an average present value of the OPEB liability to approximate \$264,500. I then assumed that approximately 81% of the retirees actually elected OPEB coverage.

It was necessary for me to adopt this simplistic projection due to the lack of information provided by the City regarding the retirees who were included in the OPEB valuation and the basis for the claim calculation. I was unable to value the OPEB liabilities. I instead calculated an expected present value using information from the documented valuations.

If those retirees should not be included in the valuation, I estimate that the City's OPEB claim amount is inflated by \$185 million.

B. If the COPs transaction had never occurred, either the City contributions to the pension plans would be unattainably high, or additional cuts to benefits would have been required.

As part of my assignment, I was also asked to develop recovery percentages assuming that the COPs transaction never occurred in 2005. The proceeds of the pension obligation bonds ("POB") were deposited into the pension plans in 2005 – approximately \$740 million into the GRS and approximately \$693 million into the PFRS.

In order to make that determination, I started with the total asset amounts in the plans as of July 1, 2005. I then reconciled each year's activity through June 30, 2013. Lastly, using the actual investment returns for each year, I calculated an annual rate of return for each of the years during the 2005 to 2013 time period.

If the funds attributable to the COPs transaction had not been contributed, and the City contributions were the same for each year from 2006 on, the asset value for GRS as of June 30, 2013 would have been \$1.490 billion (\$2.099 billion actual) and the asset value for PFRS would have been \$2.524 billion (\$3.035 billion actual).

The hypothetical balances were determined by subtracting out the special contributions from the June 30, 2006 asset values, then reconciling each year up to 2013 using all actual data, excluding investment returns. Investment returns were then determined by applying the rate of return on the adjusted beginning of year balance.

⁷¹ 9% for 2011 and 8.5% for 2012.

I determined the hypothetical impact on both GRS and PFRS under two scenarios. In both scenarios, I assumed that the PVVAB used to determine the claim remained the same (assuming no changes to benefits prior to the Petition Date). The difference in the two scenarios is in the calculation of the numerator.

In the first scenario, I assumed that the recovery amounts remained the same as they are in the current Plan. With a lower starting asset value, and no additional contributions being added, additional reductions to benefits are required. In this scenario, benefits for GRS would have to be reduced by approximately 29.5% (as opposed to the currently proposed 4.5%) and PFRS benefits would be reduced by 15% (currently there is no benefit reduction).

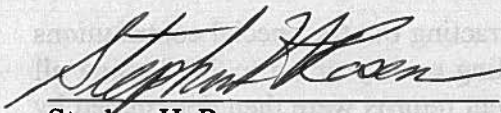
The second scenario assumes that the benefit reductions remain the same, which means that there would have to be increases in future City contributions. In this scenario, I assumed that all contribution increases would occur after 2023. Under the current Plan, the City is projected to contribute \$1.4 billion each to GRS and PFRS from 2024 to 2053. If the COPs transaction had never occurred, the contributions for the same time period would be \$3.3 billion for GRS and \$3.2 billion for PFRS.

Had the COPs transaction never occurred, the recovery percentages in Scenario 2 for both GRS and PFRS would still be at the same levels detailed in the earlier section and Table 7 of my report. This is due to the fact that both the claim amounts (due to lower asset levels) and the recovery amounts (due to higher contribution levels) would increase.

Under the first scenario, the recovery percentages for GRS would approximate 71% (currently 117%) and for PFRS would approximate 68% (currently 116%).

My opinions are based upon information available to me as of the date of this report. It is possible that additional information may affect my opinions herein. I will consider any additional information that becomes available and may modify or supplement my analysis and opinions.

Executed on this 29th day of July, 2014:


Stephen H. Rosen

APPENDIX A

(CURRICULUM VITAE)

FTI Consulting

Three Times Square
9th Floor
New York, NY 10036
Tel: 856 427 6834

Education

B.A., Mathematics,
Rutgers, The State
University

Business Administration,
University of
Pennsylvania, Wharton
School

Actuarial Science,
University of Iowa

Professional Affiliations

Certified Pension
Consultant (CPC)

Enrolled Actuary (EA)

Fellow of the Conference
of Consulting Actuaries
(FCA)

Member of the American
Academy of Actuaries
(MAAA)

Member, Society of
Pension Actuaries
(MSPA)

Stephen Rosen is a managing director in the FTI Consulting Forensic and Litigation Consulting practice and is based in New York. He is an Enrolled Actuary with over 40 years of experience consulting to pension plan sponsors and their advisors in the United States. This work included the design, implementation, and administration of all forms of qualified employee benefit plans.

Mr. Rosen's clients have included law firms, accounting firms, actuarial firms, and insurance companies, which have used his advice to enhance their own service offerings. Mr. Rosen has also prepared actuarial reports to support litigation and analysis of loss of benefits disputes.

Mr. Rosen has completed course work in mathematics (Rutgers, 1971), business administration (Wharton, 1974), and actuarial science (Iowa, 1975). He is a Member of the American Academy of Actuaries (1976), an Enrolled Actuary (1976), a Member of the American Society of Pension Professionals and Actuaries (1975), a Certified Pension Consultant (1981), and a Fellow of the Conference of Consulting Actuaries (2006). Mr. Rosen has served in various capacities with the American Society of Pension Professionals and Actuaries, including President (2005), Treasurer (2001-2003) and on the Board of Directors (1998-2003).

Mr. Rosen has been a frequent speaker and has published articles on pension related issues. He has also served as an expert witness in support of his clients.

EMPLOYMENT EXPERIENCE

FTI Consulting (4/1/13-Present)

- Practice Leader, Pension Consulting Services Group

Founder of SHR Consulting, LLC (2009-Present)

- Expert Testimony
- Strategic business & leadership development
- Succession planning

United Retirement Plan Consultants (successor to Stephen H. Rosen & Associates)

- Senior Consultant (2010-2013)
- Senior Vice President of Business Development (2007-2010)

Founder of TPA Resources, LLC (2012-Present)

- Best Practices for TPA Business Owners and Managers
- Comprehensive Web Portal Offering

Founder of Stephen H. Rosen & Associates, Inc. (1983 – 2012)

- Design, implement and administer all forms of Qualified (IRS approved) Retirement Plans
- Retained as consultant to law firms, accounting firms, insurance companies and actuarial firms
- Prepared actuarial reports detailing present value and damage calculations

Paul A. Tanker & Associates (1971-1982)

- Vice President and Shareholder

PROFESSIONAL ACTIVITIES (Main Positions)

American Academy of Actuaries

2010-2013	Secretary
2003-05; 2009-10	Member, Board of Directors
2009-Present	Member, Public Issues Committee
Various	Disciplinary Panels

American Society of Pension Professionals & Actuaries (ASPPA)

2004-2005	President, President-Elect
2001-2003	Treasurer
1998-2003	Member, Board of Directors
Various	Disciplinary Panels
1985	Annual Meeting – Program Co-Chair
2006-2009	Advanced Actuarial Conference-Chair
2003-2006	Mid-Atlantic IRS Benefits Conference & Regional Meetings – Chair
1980-2000	Government Affairs, Finance & Budget, and Examination Committees
1998-Present	Founder and Past President, ASPPA Benefits Council of Greater Philadelphia

Conference of Consulting Actuaries

2004-Present Fellow

Philadelphia Actuaries Club

1995-Present Member and Speaker

ASpire Financial, Tampa, FL

2012-Present Advisory Board Member

RTD Financial, Philadelphia, PA

2009-2013 Advisory Board Member

EFM Advisory, Turnersville, NJ

2010-2013 Advisory Board Member

John Hancock Retirement Services, Boston, MA

2006-2010 TPA Advisory Board Member

LECTURES AND SEMINARS

Mr. Rosen actively speaks on a variety of topics including qualified retirement plans, actuarial science, and other related subjects. Examples of events at which Mr. Rosen has spoken are:

- American, New Jersey and Pennsylvania Institutes of Certified Public Accountants
- Enrolled Actuaries Annual Meeting, Washington, DC
- American Society of Pension Professionals & Actuaries Annual and Regional Meetings
- Northwestern Mutual Life Insurance Company Annual Meeting, Milwaukee, WI
- Estate Planning Councils of Philadelphia, Delaware and Lancaster Counties
- Tax Conference for the State of Delaware
- CPA Law Forum of Chester County, PA
- Tax Conference for Lancaster, PA
- The American College, Bryn Mawr, PA
- Institute of Employee Benefits (faculty), Philadelphia, PA

APPENDIX B

(REPORTS AND TESTIMONY)

COURT TESTIMONY AND EXPERT REPORTS

Mr. Rosen has provided testimony for court cases in the US. His more than 40 years of experience in the profession is the basis for being called upon to offer court testimony as an expert in developing valuations of employee benefits. The cases in which he has testified are:

- August, 2013, *Hone and Lightfoot v. Arkema* (Class Action), US District Court-Litigation Consulting
- July, 2013, *Fairstone v. AXA Advisors*, Montgomery County, PA-Expert Report
- June, 2013, *Clare Rose v. Boston Benefit Consulting*, Supreme Court of NY, County of Suffolk-Expert report
- April, 2013, *Abboud v. Merrill Lynch*, FINRA Arbitration-Litigation Consulting
- July 2012, *WV Investment Management Board v. VALIC*, Kanawha County, WV – Expert Report
- December 2011, *State of NY v. Om P. Soni*, Suffolk County, NY – Expert Report
- August 2010, *FTC v. ProMedica Health Systems*, Toledo, OH – Expert Report
- April 2008, *Gane v. United Airlines*, Dept. of Labor & Industry, Workers' Compensation, Philadelphia, PA – Expert Report
- February 2006, *City of San Diego*, San Diego, CA – Expert Report
- August 2004, *McShea v. City of Philadelphia* (Class Action), Commonwealth Court, Philadelphia, PA – Deposition and Trial Testimony
- March 2004, *Thomas v. Smithkline*, US District Court (Eastern), Philadelphia, PA – Deposition and Trial Testimony
- 1982, *Delaware River Port Authority*, US Superior Court, Camden, NJ – Deposition and Trial Testimony (2 different trials)

PUBLICATIONS

- *Journal of Financial Service Professionals*, Editorial Board (2004-Present)
- "Are Cash Balance Plans Really Dead?" (2004)
- *The Pennsylvania CPA Journal*, "Which Way Now?" (2004)
- *Accountant's Guide to Employee Benefit Plans*, Warren Gorham & LaMont (1997-1999)
- *The 401(k) Handbook*, "Amendment to Final 410(b) Regulations Simplifies 401(k) Testing" (1996)
- *The Tax Reform Act of 1984*, Farnsworth Publishing Company (1985)
- *FOCUS* (1983)
- *Taxation for Accountants*, "How to reduce the dollars and cents cost of complying with the new Pension Reform Act" (1975), "Revenue Agent's negative reaction to qualified plan need not be the last word" (1973)

APPENDIX C

(MATERIALS CONSIDERED)

Actuarial Standard of Practice No. 4

Actuarial Standard of Practice No. 27

PFRS June 30, 2011 Annual Actuarial Valuation

PFRS June 30, 2012 Annual Actuarial Valuation

PFRS June 30, 2013 Annual Actuarial Valuation

GRS June 30, 2011 Annual Actuarial Valuation

GRS June 30, 2012 Annual Actuarial Valuation

GRS June 30, 2013 Annual Actuarial Valuation

PFRS June 30, 2012 audit

PFRS June 30, 2013 audit

GRS June 30, 2012 audit

GRS June 30, 2013 audit

June 30, 2011 City of Detroit City Healthcare Plan Actuarial Valuation

Fourth Amended Disclosure Statement – Docket number 4391

Letter from Milliman to Evan Miller dated April 17, 2014 Re: DPFRS Actuarial Accrued Liability as of June 30, 2013 (POA 259442)

Letter from Milliman to Evan Miller dated April 17, 2014 Re: DGRS Actuarial Accrued Liability as of June 30, 2013 (POA 259729)

Letter from Milliman to Evan Miller dated April 23, 2014 Re: DPFRS Estimated Funded Status and Unfunded Liability in 2023 under a 55% COLA reduction scenario with a 6.75% investment return assumption and four scenarios combining specified Employer Contributions from 2014-2015 to 2022-2023 to and assumed market value of assets returns during 2013-2014 (POA 259964)

Letter from Milliman to Evan Miller dated April 25, 2014 Re: DGRS Estimated Employer Contributions Required in 2014-2015 to 2022-2023 to have 70% Funded Status in 2023 under an Annuity Savings Fund recoupment (20% cap) and 4.5% benefit reduction scenario with a 6.75% investment return assumption (POA 259901)

Letter from Milliman to Evan Miller dated April 17, 2014 Re: Requested Supplemental Information for DGRS (POA 259635)

Letter from Milliman to Evan Miller dated April 17, 2014 Re: Requested Supplemental Information for DPFIRS (POA 259851)

GRS Investment Policy

PFRS Investment Policy

Internal Revenue Service Revenue Procedure 2010-3

Internal Revenue Service Revenue Procedure 2000-40

Ibbotson SBBI 2013 Valuation Yearbook

Cambridge Associates, LLC U.S. Private Equity Index.

MSCI US REIT Index

Alerian MLP Index

HEDGNAV Index

Price Waterhouse Coopers (PWC) Pension/OPEB 2013 Assumption and Disclosure Survey

Boston College Public Pension Database

NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, December 2013

NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, Updated April 2014

Milliman 2013 Public Pension Fund Study

Milliman 2012 Public Pension Fund Study

Expert Report of Kim Nicholl

Owadally

Expert Report and Deposition of Kenneth Buckfire

Deposition of Glen Bowen

City of Detroit Proposal for Creditors Executive Summary, June 14, 2013

Expert Report and Deposition of Alan Perry

Deposition of Cynthia Thomas

APPENDIX D

(SUPPLEMENTAL REPORTS)

Table from Report and Table Using Target GRS and PFRS Investment Returns

Table 7 from Report

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%
7.5% Discount Rate	1.018	1.118	109.8%	0.795	0.735	92.5%
Include UTGO Income Stab Fund	1.018	1.126	110.6%	0.795	0.743	93.5%
ROR Assets 7.5%	1.018	1.155	113.4%	0.795	0.887	111.6%
Buckfire Discount Rates for Dist	1.018	1.187	116.6%	0.795	0.921	115.9%

Claims for GRS using 7.9% discount rate and PFRS 8.0% discount rate

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%
Vested Benefits Only	1.258	1.118	88.9%	1.094	0.735	67.2%
7.9%/8.0% Discount Rate	0.910	1.118	122.9%	0.611	0.735	120.4%
Include UTGO Income Stab Fund	0.910	1.126	123.7%	0.611	0.743	121.6%
ROR Assets 7.9%/8.0%	0.910	1.210	133.0%	0.611	0.968	158.5%
Buckfire Discount Rates for Dist	0.910	1.242	136.5%	0.611	1.002	164.1%

The tables below and on the following page show recovery percentages individually for each problem with the City's claim and recovery, as indicated in my report.

Use of Present Value of Accrued Benefits for Claim Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Appropriate Funding Method	1.336	1.118	83.7%	1.215	0.735	60.5%

Exclusion of Non-vested Benefits for Claim Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Vested Benefits Only	1.394	1.118	80.2%	1.123	0.735	65.5%

Use of 7.5% Discount Rate for Claims Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
7.5% Discount Rate	1.236	1.118	90.5%	0.940	0.735	78.2%

Inclusion of UTGO Income Stabilization Funds for Recovery Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Include UTGO Income Stabilization	1.492	1.126	75.5%	1.250	0.743	59.5%

Use of a 7.5% Rate of Return on Assets for Restoration and Recovery Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
ROR Assets 7.5%	1.492	1.147	76.9%	1.250	0.879	70.3%

Use of AA Bond Yield Curve to Discount State and DIA Contributions for Recovery Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.118	74.9%	\$ 1.250	\$ 0.735	58.8%
Buckfire Discount Rates for Distr	1.492	1.150	77.1%	1.250	0.769	61.6%

The following tables show the recovery percentages with both State and DIA funding excluded, then with only State, then only DIA funding excluded.

Exclusion of State and DIA Funding for Recovery Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 0.894	59.9%	\$ 1.250	\$ 0.478	38.2%
Appropriate Funding Method	1.336	0.894	66.9%	1.215	0.478	39.3%
Vested Benefits Only	1.258	0.894	71.1%	1.094	0.478	43.7%
7.5% Discount Rate	1.018	0.894	87.9%	0.795	0.478	60.1%
Include UTGO Income Stabilization	1.018	0.902	88.6%	0.795	0.486	61.1%
ROR Assets 7.5%	1.018	0.931	91.5%	0.795	0.629	79.2%
Buckfire Discount Rates for Distr	1.018	0.931	91.5%	0.795	0.629	79.2%

Exclusion of State Funding for Recovery Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 1.024	68.6%	\$ 1.250	\$ 0.644	51.5%
Appropriate Funding Method	1.336	1.024	76.7%	1.215	0.644	53.0%
Vested Benefits Only	1.258	1.024	81.4%	1.094	0.644	58.9%
7.5% Discount Rate	1.018	1.024	100.6%	0.795	0.644	81.0%
Include UTGO Income Stabilization	1.018	1.032	101.4%	0.795	0.652	82.0%
ROR Assets 7.5%	1.018	1.061	104.2%	0.795	0.796	100.1%
Buckfire Discount Rates for Distr	1.018	1.089	106.9%	0.795	0.825	103.8%

Exclusion of DIA Funding for Recovery Purposes

\$ in Billions	GRS			PFRS		
	Claim	Present Value of Contributions	Recovery Percentage	Claim	Present Value of Contributions	Recovery Percentage
The City's Plan	\$ 1.492	\$ 0.988	66.2%	\$ 1.250	\$ 0.569	45.5%
Appropriate Funding Method	1.336	0.988	74.0%	1.215	0.569	46.8%
Vested Benefits Only	1.258	0.988	78.6%	1.094	0.569	52.0%
7.5% Discount Rate	1.018	0.988	97.1%	0.795	0.569	71.6%
Include UTGO Income Stabilization	1.018	0.996	97.9%	0.795	0.577	72.6%
ROR Assets 7.5%	1.018	1.025	100.7%	0.795	0.721	90.7%
Buckfire Discount Rates for Distr	1.018	1.030	101.1%	0.795	0.725	91.2%